LANDesk® Application Virtualization

Distributing, Updating and Managing Virtual Software Applications Quickly and Cost Effectively

LANDesk® | make IT happen
An Avocent® Company

Contents

Executive Summary

The term "virtualization" has become the rage initiative for many of today's IT managers. It offers the promise of a true balance between increased productivity and reduced costs for global enterprises and small emerging companies alike. Yet virtualization itself means different things to different organizations depending on their strategies and objectives. While the definitions of virtualization vary, there are essentially three main virtualization types—hardware virtualization, operating system virtualization and application virtualization.

LANDesk has unveiled a new solution known as LANDesk® Application Virtualization that enables organizations to quickly deploy, update, and manage virtual applications through the flagship LANDesk® Management Suite technology with minimal changes to their existing infrastructure. This new application virtualization solution is timely for current LANDesk customers and other organizations considering migration to Microsoft Vista because migration could expose application conflicts with key, but not yet Vista-certified, applications. Combining application virtualization with LANDesk's core set of Vista migration tools can eliminate those conflicts and greatly simplify the move to Vista.

LANDesk Application Virtualization uses a client-less application virtualization architecture that allows applications to be run from any LAN, WAN, USB, CD-ROM drive, etc., with zero-footprint on the host PC. The applications, packaged into simple EXE files and distributed via LANDesk Management Suite, are isolated or sandboxed from the host PC and run exclusively in user mode. This ensures seamless execution on locked-down desktops with no device drivers installed, enabling administrators to maintain a secure, clean and stable user desktop. LANDesk Application Virtualization can transparently stream large applications from a shared network drive with no client or server software to install, as well as run the application "off-line" on the PC without installation or changes to the local desktop's registry and file system.

The subject of this whitepaper is how LANDesk Application Virtualization helps organizations significantly reduce: 1) the time and costs of regression testing; 2) end-user support costs and associated downtime caused by DLL and other application conflicts; 3) the cost of maintaining secure, locked-down desktops; 4) the need to create machine silos for specific applications; and 5) the risks associated with OS or application upgrades.

Introduction

Deploying and updating software applications in any computing environment are typically slow, costly and painful processes for IT professionals. Business processes demand more applications and require that these applications operate together seamlessly. Over time these systems have become increasingly complex and fragile, resulting in software deployments that are expensive, time consuming and support-intensive. IT departments must invest months of time on multiple-application regression testing and analysis of end-user support requirements in order to minimize the downtime caused by DLL (Dynamic Link Library) and other application conflicts. In addition to the individual software requirements, corporate IT mandates can cause additional problems for applications that may require administrator rights in order to function properly. Locked-down desktops, mobile applications that aren't mobile after installation, machine migration and multi-user environments, including Citrix, which all have their own specific requirements, contribute to the rise in costs.

Fully integrated, reliable and readily accessible software applications are becoming more available but they require inordinate amounts of planning and ongoing support. Companies today spend thousands of dollars per desktop per year managing applications.

The promise of application virtualization provides IT managers a way to effectively address the cost, security and support issues mentioned above. But it also provides solutions for many more of the initiatives being considered today, including business continuity and disaster recovery strategies and the migration to XP, Vista, and .NET. With its robustness and versatility, LANDesk® Application Virtualization is designed to provide IT managers with a broad range of solutions to the issues they face today.

Virtualization by Any Other Name

While the term "virtualization" means different things to different people, it is definitely top of mind with IT management these days. Intel is performing virtualization at the silicon level, while VMware and Microsoft's Virtual PC let administrators tackle it at the OS level. Consider for example the following definitions of virtualization:

Forrester Research: A PC environment where some or all components of the system, including operating systems and applications, execute in a protected environment, isolated from the underlying hardware and software platform. The virtualization layer controls interactions between the virtual environment and the rest of the system.

Intel: Virtualization is a proven technology that allows one computer system to function as multiple "virtual" systems. It enables multiple operating systems and application stacks to be hosted in logically isolated partitions.

VMware: The term virtualization broadly describes the separation of a resource or request for a service from the underlying physical delivery of that service.

Microsoft SoftGrid: Application virtualization decouples applications from the operating system and enables them to run as network services.

LANDesk® Application Virtualization: Application virtualization has the ability to deploy software without modifying the local operating system.

From these definitions, we can extrapolate the three types of virtualization: 1) at the hardware level, with Intel building it into the silicon, 2) at the OS level, with VMware Server and Virtual PC abstracting processor, memory, storage and networking resources into multiple virtual machines capable of hosting multiple simultaneous Guest operating systems; and 3) at the applications level, where LANDesk Application Virtualization, Microsoft SoftGrid and other vendors come into play.

Virtualization at the Application Level

In his article for *Network Computing* entitled "Escape DLL Hell," network administrator James E. Drews says several companies are entering the emerging area of application virtualization, also known as application isolation, application sandboxing and application streaming. As Drews explains, the process involves wrapping the application in a layer that isolates it from the host OS and therefore other applications. Whatever the application's process does, it cannot affect or be affected by other running applications unless the package is specifically created to interact with other programs. Any file or registry changes the application requires or performs are isolated and captured by the virtual operating system (VOS) or wrapper layer. "The result is an application that's much easier to distribute and remove from user workstations. Although virtualized applications can be used on servers, it is more likely that OS virtualization will be done on the server side and application virtualization will be relegated to the client side." [1]

Desktop Virtualization Market Landscape

Server-based Computing	Application Virtualization	Virtual Systems Software	Virtual Systems Hardware
Citrix Presentation Server	LANDesk® Application Virtualization	VMware Ace, Workstation, GSX and ESX Server	Intel Virtualization technology (Vanderpool)
Citrix GoToMyPc	Microsoft SoftGrid	Microsoft Virtual PC & Server	AMD Virtualization technology (Pacifica)
Microsoft Terminal Services	Altiris Software Virtualization Solution		

Baseline Benefits of Application Virtualization

According to Drews, most midsize and large IT departments have had to develop a method for distributing applications to users. The process might involve installing all necessary applications to a reference or "gold" machine and then using a software-distribution system, such as LANDesk® Management Suite, to distribute applications one at a time. Drews says these options suffice for basic software distribution, but can lead to library conflicts if two applications need different versions of the same DLL—for example, when Outlook and Eudora try to use different versions of the MAPI32.DLL.

Other problems can also occur in the process of upgrading applications, for instance versions of Microsoft Office. Certain documents may require being opened by the older version in order to be viewed properly, and after the upgrade, it is unlikely that both Office versions will run correctly on the same computer. Application support groups are often required to provide technical support for multiple versions of applications that by design do not allow multiple instances to be installed per machine. Application virtualization allows IT to both distribute applications more easily and run multiple versions of an application on the same machine.

Drews says it's a common practice to reinstall an OS to clean up the extra files not removed after an application is uninstalled, which can slow workstation performance. With virtualization, there is less registry bloat since the entries used by a virtualized application are never installed to the host OS registry, but into the virtual one. This results in a cleaner OS that should rarely need maintenance to the level of a reinstall. What's more, depending on the way an application was virtualized, it can be reset to its original "golden state" if necessary. Because each virtualized application's DLL instances are kept separate from all other applications, the chances that a new virtual application will interfere with previously installed applications is virtually eliminated.

An Overview of LANDesk® Application Virtualization

LANDesk® Application Virtualization is an application virtualization platform that enables the deployment of software applications as self-contained, executable (EXE) files in an isolated environment without requiring installation, system modifications, or elevated security privileges. These applications operate completely in user mode with no device drivers, which means they can run on all versions of Windows and require no administrator privileges or any prior installation.

LANDesk Application Virtualization is based on the Thinstall Virtual OS (VOS) technology component, which transparently merges a virtual system environment with the real system environment. The application can be packaged with this virtual environment into a single file that can be run without an installation process, and without modifying the resident operating system. The VOS component is approximately 300K on disk, and typically occupies 1 MB of memory at runtime and therefore has a negligible impact on memory consumption and CPU performance.

The VOS implements a small user-mode version of the Windows kernel that allows applications to be run from any LAN, WAN, USB, CD-ROM drive, etc., with zero-footprint on the host PC. The VOS is loaded and initialized by Windows in a fraction of a second, even when the packaged EXE is gigabytes in size or located on a network share. Once the VOS is loaded into memory, it is responsible for loading or streaming compressed applications from the original package source. The VOS will resolve and load any DLL or side-by-side assemblies required, start any virtual services needed by the application, and start executing the application. As the application loads additional DLLs, data files, or accesses registry entries, the VOS will transparently stream the compressed blocks of data required directly to the user's desktop. The VOS supports all the Microsoft technologies required to run complex applications, such as Microsoft Office, out-of-process COM, services-based COM, manifest policy processing, and side-by-side DLL

resolution. Microsoft Word can be loaded and running on a modern PC in less than a second from start to finish.

LANDesk virtualized applications are supported on all versions of 32-bit Windows platforms, from NT (NT/2000/XP/Vista) without installation, drivers, reboots, or administrator access. Because LANDesk Application Virtualization decompresses blocks of data directly into memory, the bandwidth required to load an application from a network share can typically be reduced by two to three times normal requirements. Moreover, no local PC disk cache storage is required, resulting in significantly lower disk-storage requirements.

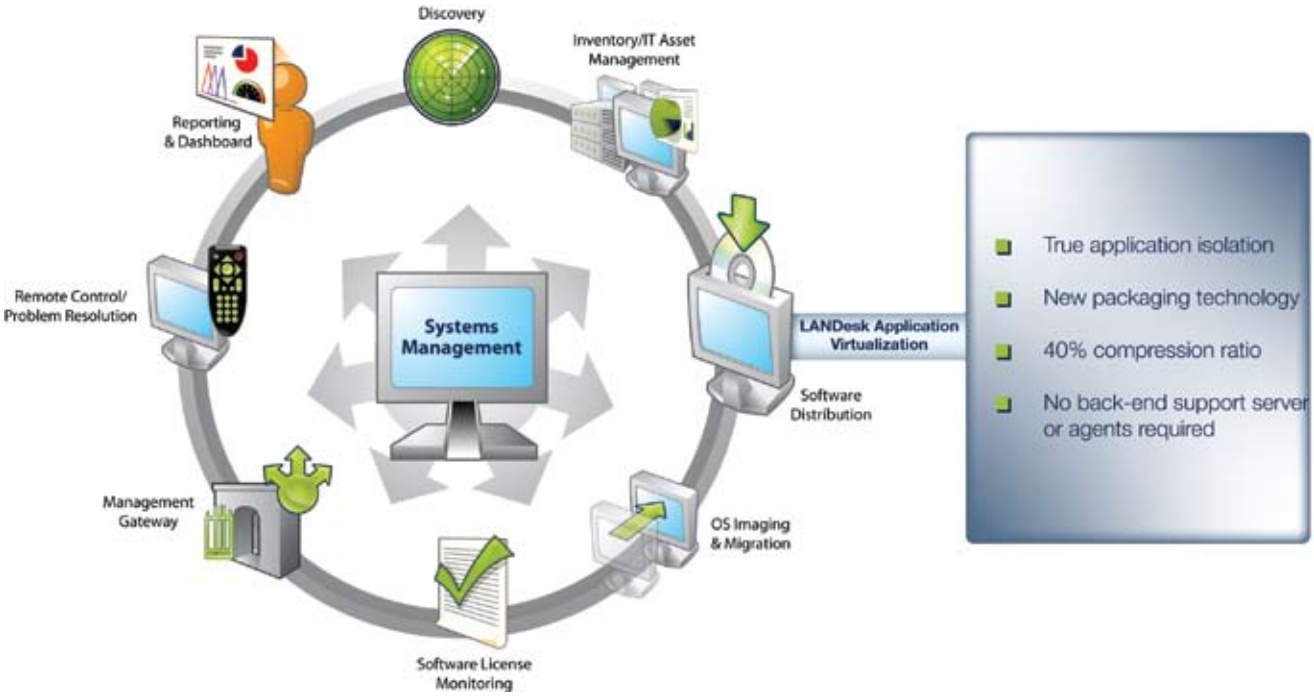
The solution's virtual file system protects the host PC from modifications by redirecting changes made by the application to an isolated per-user, per-application sandbox directory. Applications can be rolled back to their original captured state on a per-user basis by deleting the sandbox. LANDesk Application Virtualization enables applications to run without granting administrative privileges on locked-down PCs, Terminal Server, and Vista by implementing a sandboxed copy-on-write system for the registry and file system changes. The VOS dynamically remaps file system and registry locations to enable applications to instantly migrate from one OS to another. For example, a single EXE package for Microsoft Office 2003 can run on Windows 2000, Windows XP, and Vista with no changes required.

Additionally, updates to packaged applications is a simple matter of updating the application sandbox, ensuring applications do not have to be re-packaged and re-deployed each time an update is required.

Available Standalone or with LANDesk® Management Suite

While LANDesk® Application Virtualization is available as a standalone product, teaming it with LANDesk® Management Suite makes sense for several reasons. LANDesk Application Virtualization contributes the "packaging" technology, enabling seamless integration, compression, and true application isolation. LANDesk Management Suite provides the "plumbing", enabling IT staff to quickly distribute, update, and manage their LANDesk virtualized applications with minimal changes to their existing infrastructure.

LANDesk Management Suite easily deploys virtualized applications as if they were simply large document files. The entire packaging and deployment process can be accomplished in less than an hour, even when thousands of computers need to be updated. And because no client is required on an end-user PC, an application can be instantly rolled back to older versions or "uninstalled" without requiring a reboot or affecting other applications on the PC.



Efficient Delivery of Virtualized Packages with LANDesk® Targeted Multicast™

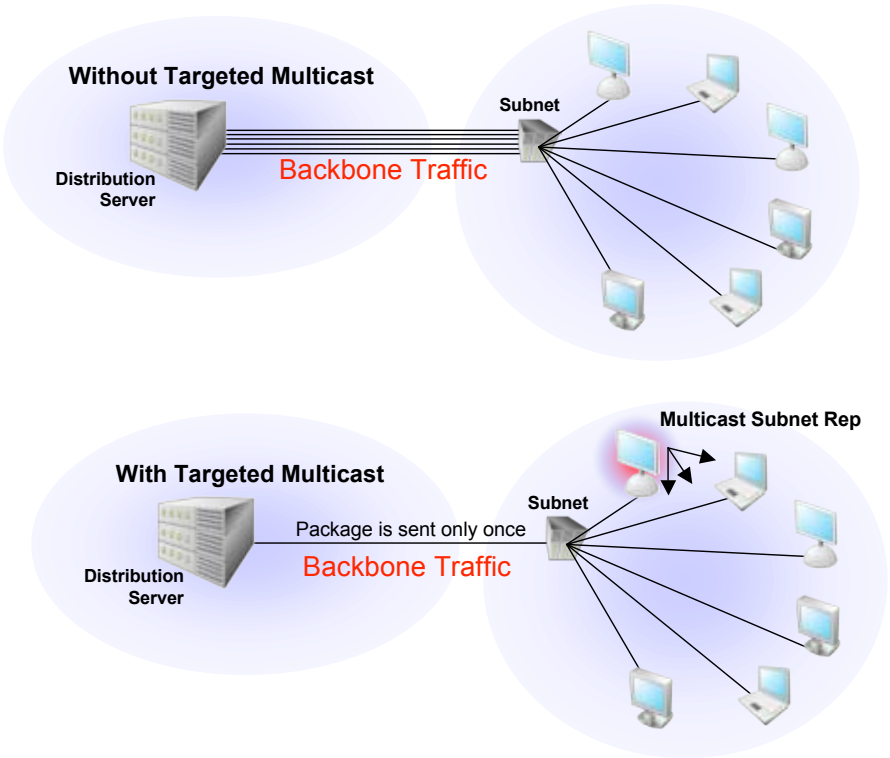
LANDesk® Management Suite includes LANDesk® Targeted Multicast™ technology that enables large virtualized packages to be efficiently delivered directly to laptop and desktop PCs over slower WAN links. For example, a 200MB virtualized application can be converted into a single, stand-alone virtualized EXE and then pushed to thousands of desktops using LANDesk Management Suite where it runs in an isolated environment without affecting other applications.

Standard software distribution uses a unicast model. For example, if IT distributes a 120MB package to 100 users, this model requires 12 gigabytes of network bandwidth to deliver individual copies of the package to each target computer. Even if staging servers or other infrastructure is used, each copy is still delivered one at a time. While standard unicast technology is effective for smaller packages or deployments to only a few machines, it's not efficient for deploying large packages to many users.

By contrast, LANDesk Targeted Multicast technology uses a representative computer on the target subnet to function as a temporary multicast broadcaster. The subnet representative pulls the distribution package down from the server using a standard http download, then multicasts it on the subnet to listening clients. The software distribution agent on each target computer then installs the software and reports its status. The package only crosses the router once, and only one copy is broadcast on the subnet.

Since the multicast happens on the LAN beneath the router, no router reconfiguration is needed to pass multicast packets, and no multicast traffic traverses the WAN. The single multicast on the subnet reduces local traffic substantially.

To conserve individual desktop hard drive space, LANDesk Management Suite can also be used to deploy virtualized applications to reliable high-speed network subnets located at branch offices. Users at branch offices can then stream compressed applications on-demand from a LAN network directly into memory with no local installation or caching required.



Executive Summary
Key Competitive Differentiators of LANDesk® Application Virtualization

One of the most significant distinguishing characteristics of LANDesk® Application Virtualization technology is its true isolation capabilities. James Drews points out in his "Escape DLL Hell" article that Thinstall (which powers LANDesk® Application Virtualization) and SoftGrid virtualized application files are not visible outside of the virtualized application, meaning the files are hidden—even from Windows Explorer. LANDesk Application Virtualization adds a layer of isolation between the OS and the application, and unlike SoftGrid, it does not require device drivers, back-end server, or a desktop client in order to achieve this isolation capability. An organization could in effect run Office 97, Office 2000 and Office XP without conflict. Because the Office applications are isolated, they know how to talk to the OS, but they don't see the other isolated OS's. In fact, LANDesk Application Virtualization is the only packager to create applications that run exclusively in user mode, assuring administrators that no additional privileges are required to run any application.

With other virtualization solutions such as Altiris SVS, says Drews, the files appear as though they were installed there by the application installer. Because of this, running multiple versions of the same program simultaneously isn't possible; instead, only one version of an application can be made active at a time. This also means that regression testing cannot be eliminated and a virus or malicious user can easily damage both virtualized and non-virtualized applications and prevent them from running. 2

In addition to the preceding observations from James Drews, another item for consideration with regard to Altiris SVS is this: whichever application is loaded last, wins. For example, let's say a company uses both Microsoft Access 97 and Access 2000. Should Access 2000 be loaded first followed by Access 97, the applications will encounter conflicts. By contrast, LANDesk Application Virtualization includes new file system and registry isolation capabilities that prevent applications from being affected by other software installed on the same system. Two versions of the same applications can appear to be installed and run from the same directory without conflicts, even where virtual and non-virtual versions exist at the same location. LANDesk Application Virtualization also provides Windows side-by-side DLL isolation capabilities without having to redevelop applications or needing to upgrade to XP/Vista.

No Back-End Support Server or Agents Required

A major technical and economic feature of LANDesk® Application Virtualization is the fact that it does not require any back-end support server or agents. By contrast, Altiris SVS, Microsoft SoftGrid, and the new Citrix Tarpon product require that an agent and back-end server be installed, considerably raising the cost and complexity of each product above that of just the software. In addition, with Altiris SVS and SoftGrid, it's not possible to install more than one version of the client simultaneously, so previously deployed virtualized applications may no longer work when a new virtualization client is installed, yet client updates may be mandatory to resolve issues for new applications or operating system features. Because LANDesk Application Virtualization has no device drivers, multiple versions can execute simultaneously without conflict, and companies can deploy new virtualized applications independently from server versions or client images.

The following table compares LANDesk Application Virtualization features against competitive product offerings:

Company	LANDesk	Microsoft	Altiris
Product	LANDesk® Application Virtualization	Microsoft SoftGrid 4.0	Altiris SVS
Application Isolation or Sandboxing	Per application	Per application	No isolation system-wide
Zero Footprint Execution	Yes	No	No
Driverless User-Mode Execution	Yes	No	No
Client & Server Requirements	None	Requires SoftGrid client, SoftGrid server, Active Directory, Database, IIS	Requires SVS agent & Client Management Suite push technology
OS Support	Windows NT, 2000, XP & XP-Embedded, Vista 2000 & 2003 Server Terminal Server, and Citrix	Windows 2000 & XP, 2000 & 2003 Server NO VISTA SUPPORT!	Windows 2000 & XP, 2003 Server NO VISTA SUPPORT!
Supports XPE + All Thin-clients	Yes	No	No
USB Portable Mode	Yes	No	No
Streaming	Yes. Uses standard SMB shares.	Yes. Requires Softricity server.	No
Supports Multiple Client Versions per Machine	Yes	No. Only one version of the SoftGrid client can be installed at a time.	No. Only one version of the SVS client can be installed at a time.
Supports Isolated Office 97, 2003, 2007, and .NET	Yes	Yes	No isolation, but does support these applications.

Summary Benefits of LANDesk® Application Virtualization

LANDesk® Application Virtualization helps IT departments:

- Significantly reduce regression testing costs—Applications can be deployed and run in independent sandboxes, eliminating the need for expensive and time consuming multi-application regression testing.
- Greatly reduce the cost of maintaining secure locked-down desktops—Isolated applications can run in restricted user accounts without requiring any host modifications.
- Consolidate terminal server and MetaFrame servers—The need to create machine silos for specific applications due to conflicts or security is eliminated.
- Accelerate software development—Developers can use the latest runtimes, frameworks and libraries instead of being restricted by shared components that are not backwards-compatible with older applications.
- Enhance workforce mobility, business continuity and disaster recovery—Applications can be run offline directly from any external media, including USB Flash, CDROM and unattached laptops.

Additional benefits include:

- No infrastructure or client changes required—Applications can be deployed using any existing software deployment systems, including LANDesk® Management Suite and ZENworks. LANDesk Application Virtualization has no client or server components to manage or maintain, and it can transparently stream large applications from any network-attached storage devices without server software.

- User-mode-only secure execution—Microsoft's best practices recommend user mode solutions to reduce the scope and impact of security breaches. LANDesk Application Virtualization executes entirely in user mode with no kernel-mode code or device drivers, enabling seamless distribution to locked-down desktops with full assurances that local security policies cannot be violated by kernel-mode calls. LANDesk Application Virtualization:
  - Helps mobile users by turning managed kiosk PCs into preconfigured workstations with any USB Flash device.
  - Ensures system stability and limits application changes to specific user-mode sandboxes in Citrix and MS Terminal Server environments. Eliminates the need to grant applications administrator privileges on the machine as these rights can be built into the application package, which allows writing to global file system or registry locations of the Thinstall VOS if required.
- Streaming without infrastructure changes—Using streaming, LANDesk Application Virtualization can launch very large applications from any shared LAN resource in seconds. It can stream application code and data from a standard Windows fileserver or network share without a client install or specialized servers required, enabling application streaming with no infrastructure changes. Users can launch an application from a local shortcut, network share, URL, or email link. Active Directory can be used to limit access of applications to specific sets of users.
- Windows Vista ready—LANDesk Application Virtualization fully supports Windows Vista and makes migration easier by eliminating LUA related errors and compatibility issues.
- Sandboxing prevents modifications—LANDesk Application Virtualization redirects all changes intended for the host PC's file system and registry to a private per-user, per-application sandbox. Sandboxes can be located locally or on a network share, allowing application settings to follow users as they move from machine to machine. Because all changes can be separated from the host OS, old or broken machines are easily replaced with no user impact and very little administrative overhead because applications do not have to be installed in order to be distributed. For mobile users, sandboxes can be stored on local USB Flash devices, thus preventing damage to the host PC or accidental host storage of sensitive data.
- Freedom for developers—LANDesk Application Virtualization enables corporate developers to choose from the latest tools and technologies without concern for deployment issues, backwards compatibility of shared components, or desktop integration/regression testing. The solution supports .NET, Java, ActiveX, COM, MDAC, ODBC, and allows the latest developer technologies to be deployed to restricted user accounts with zero installation or impact on other applications.

Conclusion

As the demand for seamless interoperation of multiple business applications continues to grow, so will the need for robust application virtualization solutions. The benefits of seamless integration and genuine isolation found in LANDesk® Application Virtualization, coupled with the distribution capabilities of LANDesk® Management Suite, will help organizations reduce multi-application regression testing costs, simplify change management, manage and control software access, enable new software framework technologies to be deployed faster, and boost IT responsiveness in making changes and updating applications.

References

[1] "Escape DLL Hell," James H. Drews, Network Computing, August 31, 2006, p. 1

[2] Ibid, p. 2

Visit www.landesk.com for more information.